



**Gel Doc™ XR**

**170-8170**

**170-8171**

**ChemiDoc™ XRS**

**170-8070**

**170-8071**

## **Hardware Instruction Manual**

## Important

Please read these instructions before attempting to install or operate the Gel Doc™ XR or ChemiDoc™ XRS.

**Note: This instrument is suitable for research use only.**

It must be used, therefore, only by specialized personnel that know the health risks associated with UV radiation and with the reagents that are normally used with this instrument. Use of the acrylic screen doesn't guarantee protection of the user from UV radiation. The use of protective eyeglasses or mask and gloves is strongly recommended.

## Wichtig

Bitte lesen Sie die Anweisungen und Machen Sie sich mit der Bedienungsweise vertraut , bevor Sie den Hood benutzen.

**Anmerkung: Dieses Geraet ist nur fuer Forschungszwecke geeignet.**

Ausserdem ist die Benutzung nur fuer spezialisiertes Personal gedacht, das mit den Gesundheitsrisiken vertraut ist, die an die UV-Strahlung gebunden sind und den Reagentien, die normalerweise mit diesem Geraet benutzt werden.

Die Benutzung eines Plexiglasschutzschildes garantiert dem Benutzer keinen Schutz vor UV-Strahlung. Die Benutzung von Schutzbrille oder Schutzmaske ist strengstens empfohlen.

## Warranty

The Gel Doc™ XR, and Chemi™ XRS are warranted against defects in materials and workmanship for 1 year. If any defect occurs in the instrument during this warranty period, Bio-Rad Laboratories will repair or replace the defective parts at its discretion without charge. The following defects, however, are specifically excluded:

- Defects caused by improper operation.
- Repair or modification done by anyone other than Bio-Rad Laboratories or an authorized agent.
- Use of spare parts supplied by anyone other than Bio-Rad Laboratories.
- Damage caused by accident or misuse.
- Damage caused by disaster.
- Corrosion caused by improper solvents or samples.

## Garantie

Die Garantie fuer den Hood betraegt 1 Jahr auf Herstellungs- und Materialfehler.

Bei Auftreten von Fehlern waehrend der Garantiezeit repariert oder ersetzt Bio-Rad Laboratories die fehlerhaften Teile auf eigene Kosten. Die folgenden Schaeden sind in jedem Falle ausgeschlossen:

- Schaeden durch unsachgemaesse Bedienung bedingt.
- Instandsetzungen oder Veraenderungen durch nicht authorisiertes Personal von Bio-Rad Laboratories
- Benutzung von Ersatzteilen, die nicht von Bio-Rad Laboratories geliefert wurden.
- Schaeden durch Naturkatastrophen verursacht.
- Schaeden durch unsachgemaessen und fehlerhaften Gebrauch verursacht.
- Korrosionsschaeden durch ungeeignete Loesungen oder Proben.

## Regulatory Notice

**IMPORTANT:** The Gel Doc™ XR, and ChemiDoc™ XRS are designed and certified to meet ENC1010, the internationally accepted electrical safety standards and EMC regulations and TUV. Certified products are safe to use when operated in accordance with the instruction manual. This instrument should not be modified or altered in any way. Modification or alteration of this instrument will:

1. Void the manufacturer's warranty.
2. Void the regulatory certifications.
3. Create a potential safety hazard.

**NOTE:** Bio-Rad Laboratories is not responsible for any injury or damage caused by use of this instrument for purposes other than those for which it is intended, or by modifications of the instrument not performed by Bio-Rad Laboratories or an authorized agent.

## Richtlinien

**WICHTIG:** Dieses Geraet, von Bio-Rad Laboratories konstruiert, besitzt das Zertifikat ENC1010 anerkannt von dem internationalen elektrischen Sicherheitsstandard EMC und unterliegt dessen Richtlinien und TUV. Die Geraete sind sicher im Gebrauch, wenn die vorliegende Bedienungsanleitung beachtet wird. Dieses Geraet darf auf keinen Fall veraendert werden. Eventuelle Veraenderungen fuehren zu:

1. Ungueltigkeit der Herstellergarantie
2. Ungueltigkeit des Zertifikats
3. Eventuelles Sicherheitsrisiko

**Bemerkung:** Bio-Rad Laboratories haftet nicht fuer Verletzungen an Personen oder Sachschaeden, hervorgerufen durch eine nicht vorhergesehene Benutzung des Geraetes. Ebenso uebernimmt Bio-Rad Laboratories keine Haftung fuer Veraenderungen, die von nicht autorisierten Personen durchgefuehrt wurden.

## **General Precautions**

- Please read the instruction manual carefully.
- The instrument must be used only for the intended purpose of gel documentation in research laboratories.
- The instrument must be connected to a power source line which **MUST BE** grounded and protected by a circuit breaker.
- Do not pour liquids directly on or inside the instrument.
- Switch off all the lights immediately after use.
- Clean the transilluminator platen after use.

## **Generelle Vorsichtsmassnahmen**

- Bitte die Bedienungsanleitung aufmerksam lesen.
- Das Geraet darf nur fuer die vorgesehenen Applikationen eingesetzt werden, d.h. Geldokumentation in Forschungslaboratorien.
- Fuer die Stromversorgung des Hood muss eine geerdete Steckdose benutzt werden.
- Keine Fluessigkeiten auf oder in das Geraet giessen.
- Die Lampe sofort nach dem Gebrauch ausschalten.
- Den UV-Filter des transilluminators nach Gebrauch reinigen.

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## Section 1 Introduction

The Bio-Rad Gel Doc™ XR, and the ChemiDoc™ XRS Gel Documentation systems are easy-to-use, high-performance systems. They use a CCD Camera to capture images in real time, which allows you to more accurately position and focus the image. While using Bio-Rad Quantity One® software, acquired images can be optimized, annotated, analyzed, and printed.

The Bio-Rad Gel Doc™ XR, and the ChemiDoc™ XRS systems utilize an enclosure (Universal Hood II) that is light tight and contains UV illumination and white light illumination. Please note that both the Gel Doc XR and ChemiDoc™ XRS Cameras have external power supplies.

### 1.1 Computer Requirements

This software will run under Windows 2000 or XP, or on a Macintosh PowerPC.

The amount of computer memory required for using the program is mainly determined by the size of the images you will scan and analyze. Images scanned at high resolution can be quite large. For this reason, we recommend that you archive images on a network file server or removable storage media.

### 1.2 PC

The following is the recommended system configuration for installing and running on a PC:

<b>Operating system:</b>	Windows 2000, Windows XP,
<b>Processor:</b>	Intel Pentium 400 MHz or better
<b>RAM:</b>	128 MB or more for Gel Doc™ XR, and ChemiDoc™ XRS systems.
<b>Hard disk space:</b>	3 GB or greater
<b>Monitor:</b>	17" monitor or better, 1024 x 768 resolution (absolutely required), True color.
<b>Printer:</b>	Optional.

### 1.3 Macintosh


The following is the recommended system configuration for installing and running on a Macintosh:

<b>Operating system:</b>	System Mac OS 10
<b>Processor/Model:</b>	PowerPC G3 processor or better.
<b>RAM:</b>	256 MB or more for Gel Doc™ XR, and ChemiDoc™ XRS systems.
<b>Hard disk space:</b>	3 GB
<b>Monitor:</b>	17" monitor, 1024 x 768 resolution (absolutely required), Millions of colors.
<b>Printer:</b>	Optional.

## Section 2 Important Safety Information

### 2.1 Important Notice

Use of the Gel Doc™ XR, and ChemiDoc™ XRS involves UV illumination. Proper precautions must be taken to avoid eye and skin exposure to the UV radiation. This instrument is meant for use only by specialized personnel that know the health risks associated with UV radiation and the reagents that are normally used with this instrument. The acrylic shield provides some UV protection. However, it does not guarantee complete protection, and it is designed to shield only the person working in front of the system.

	<b>WARNING:</b> <i>The operator should wear appropriate safety glasses or a protective mask and gloves in addition to using the UV Safety Shield provided with this instrument.</i>
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**Anmerkung: Dieses Geraet ist nur fuer Forschungszwecke geeignet.**

Ausserdem ist die Benutzung nur fuer spezialisiertes Personal gedacht, das mit den Gesundheitsrisiken vertraut ist, die an die UV-Strahlung gebunden sind und den Reagentien, die normalerweise mit diesem Geraet benutzt werden.

Die Benutzung eines Plexiglasschutzschildes garantiert dem Benutzer keinen Schutz vor UV-Strahlung. Die Benutzung von Schutzbrille oder Schutzmaske ist strengstens empfohlen.

### 2.2 Power Safety information

- a) **Voltage Setting Information:** The Universal Hood II has a power supply that automatically chooses the correct voltage for your country or region.
- b) **Fusing:** The Universal Hood II has two user serviceable fuses. These are located at the following location:
  - F1 and F2 are located on the bottom rear panel and are a part of the power entry module, please see picture below for details:



Fuse F1 and F2 are located in this drawer. Use a screwdriver and pull the drawer out to see the fuses

**Main power entry module**



## Section 3 Product Description

### 3.1 CCD Camera and Lenses

A CCD Camera is placed on top of the Universal Hood II for capturing images. The Camera comes with a Motorized Zoom Lens (MZL) that allows a remote adjustment of the lens control functions viz. zoom, focus and iris.

For ChemiDoc™ XRS systems optional lenses with low F-number are available that offer extreme light collection efficiency for low light applications like chemiluminescence.

Lens f 0.95, 25 mm, Wide Angle	1708072
Lens f 0.95, 17 mm, Wide Angle	1708073

### 3.2 Darkroom Enclosure, Emission Filters, and Illumination Sources

The Universal Hood II is designed to capture fluorescence and chemiluminescence images without using a photographic darkroom. The enclosure has built-in white light epi-illumination and a UV transillumination. An optional White Light Transilluminator (170-7950) or a White Light Conversion Screen (170-8001) may also be used with the system.

For easy sample loading, the UV transilluminator is located in the drawer of the Universal Hood II and can be accessed from the front of the enclosure. For your convenience, the lights in the darkroom enclosure turn off automatically after about 15 minutes. This time period can be extended indefinitely by pressing the HOLD button.

The Universal Hood II has a three position Filter Slider that offers the flexibility of using two different emission filters for fluorescence applications as well as the ability to image chemiluminescence samples (no filter).

Bio-Rad Laboratories offers a selection of filters and illumination sources.

<b>Standard Filter:</b>	<b>Comes with each system.</b>	
548-630nm	Amber Filter (Ethidium Bromide)	170-8081
<b>Optional Filters:</b>	<b>Can be purchased for Optimal performance.</b>	
520DF30 nm	Optional Filter for SYBR Green/ SYBRGold/ GFP/ Fluorescein	170-8074
560DF50 nm	Optional Filter for CY3/Rhodamine/Sypro Orange	170-8075
630BP30 nm	Optional Filter for SYPRO Ruby/Texas Red	170-8076
480BP70 nm	Optional Filter for Hoechst/Coumarin	170-8077
<b>Optional Illumination Sources:</b>		
White Light Transilluminator		170-7950
White Light Conversion Screen		170-8001
302 nm UV lamps 6 ea. (shipped standard with each system)		170-8097
254 nm UV lamps 6 ea		170-8098
365 nm UV lamps 6 ea		170-6887

### ***3.3 PCI interface Cards***

#### **Gel Doc™ XR:**

The Gel Doc™ XR system requires a Fire Wire port to communicate with the computer where the user interface software is installed. In case of computers that do not offer a Fire Wire (IEEE1394) interface, a PCI Fire Wire card (included with the system) needs to be installed in the computer to communicate with the Camera.

**Note: Read and follow the instructions for installing the PCI card, drivers and Software in Appendix C and D.**

#### **ChemiDoc™XRS:**

The ChemiDoc™ XRS system requires a PCI Digitizing card to communicate with the Camera. This card needs to be installed in all PC and Mac systems with appropriate drivers (included in the software).

**Note: Read and follow the instructions for installing the PCI card, drivers and Software in Appendix C and D.**

### ***3.4 Quantity One® Software***

Each system ships with 1 full version of Quantity One® and unlimited copies of Quantity One® Basic Mode. The software can be used to annotate and document images, analyze molecular weights, print, and perform a host of other applications. See the software manual for detailed instructions on how to install and operate the software.

**Note: Read and follow the instructions in Appendix C and D prior to installing Quantity One® software.**

### ***3.5 Printer (Optional)***

For your convenience, Bio-Rad offers an optional USB printer for use with the Gel Doc™ XR and ChemiDoc™ XRS:

**Sony UPD895 (recommended for both the systems)**

**170-8066**

### ***3.6 Packaging***

The Gel Doc™ XR, or ChemiDoc™ XRS systems consist of multiple components. Each of them may be in a separate box or in one box with a label describing the catalog numbers and its contents. Please make sure that all the system components are in your shipment. Please unpack each component carefully and verify that you have the correct one. Each system includes the following:

<b>Part #</b>	<b>Descriptions</b>
<b>170-8170/170-8171</b>	<b>Gel Doc™ XR System PC/Mac</b>
170-8062	Universal Hood II W/TLUM 100/240 Vac
170-8172	Gel Doc™ XR Camera and Cable w/MZL
170-8173	Gel Doc™ XR Fire Wire card (PC System only)
170-8080	Kit Accessory, Universal Hood II
170-7964/7963	Cable, Serial, MZL, PC/Mac
170-9600	Quantity One® Software PC/Mac
170-8009	Adapter, USB to Serial (Mac System only)

<b>Part #</b>	<b>Descriptions</b>
<b>170-8070/170-8071</b>	<b>ChemiDoc™ XRS System PC/Mac</b>
170-8062	Universal Hood II W/TLUM 100/240 Vac
170-8088	ChemiDoc™ XRS Camera W/MZL (including PCI card and Camera Controller Cable)
170-8080	Kit Accessory, Universal Hood II
170-8008	Fluorescent Reference Plate
170-7964/7963	Cable, Serial, MZL, PC/Mac
170-9600	Quantity One® Software PC/Mac
170-8009	Adapter, USB to Serial (Mac System only)

## Section 4 Getting Started

### 4.1 Selecting a Location

The Gel Doc™ XR and ChemiDoc™ XRS systems can be placed on any bench top. The best position is near the computer where Quantity One® will be operating. Remember to leave space to easily access the power switch on the Universal Hood II, which is located at the rear bottom left side of the enclosure

### 4.2 Assembling the System

#### 4.2.1 Assembling the Universal Hood II



**Important:** It is recommended that the Universal Hood II be carried by at least two people holding the instrument from the bottom side. Be sure that the door and the drawer are completely closed.

**Wichtig:** Es wird empfohlen, dass mindestens zwei Personen den Hood transportieren und dabei das Gerät am Geräteboden halten.

- a) Open the box and review the unpacking instructions.
- b) Carefully remove all of the components of your system.
- c) Remove the top foam and the plastic wrapping from the Universal Hood II.
- d) Carefully pull the enclosure out of the bottom foam and place it in a suitable location.

**Note:** Please do not connect the power cable to a power source until all connections are made. The power source has to be grounded and protected by a circuit breaker.

- e) Locate the Amber Filter in the Accessory Kit and thread it onto one of the two 62 mm rings of the Filter Slider (inside of the hood). The Filter Slider facilitates the selection between two filters and an open position for chemiluminescence.
- f) The three selectable positions are indicated by three symbols **O (no filter)**, **I (filter 1)** or **II (filter 2)** on the right side of the Camera support. Note the position of the Amber Filter for future use. See pictures below.

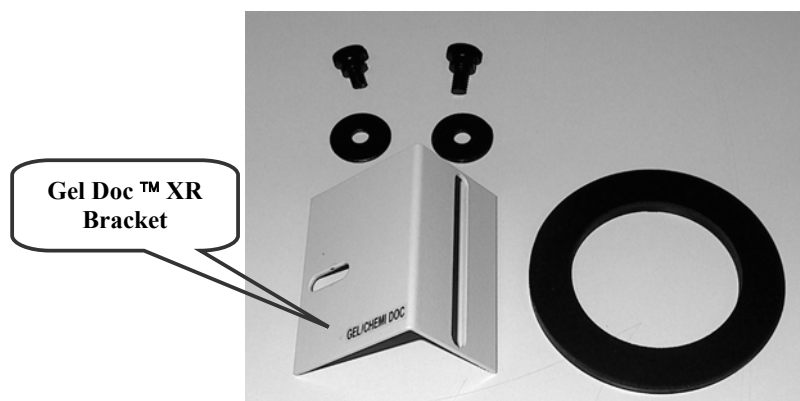


Three positions sliding filter

## 4.2.2 Assembling the CCD Camera

### Gel Doc™ XR

- a) Place the Camera on the bench so that the two tripod mount holes are facing you.
- b) Using one of the two knurled screws and washers attach the Gel Doc™ bracket to the Camera as shown in the picture below. Use the tripod mounting hole that is closest to the top of the Camera. Do not tighten the screws yet.
- c) The black adapter ring provided (3 millimeters thickness) has a soft and a hard side to it.
- d) Position this adapter plate on top of the Universal Hood II such that the soft side of the ring is facing up and the ring is concentric with the round opening on the universal hood.



Gel Doc™ XR bracket, washers, screws and adapter

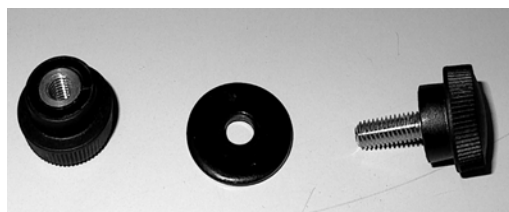


Gel Doc™ XR Camera and bracket

- e) Place the Camera over the Universal Hood II by inserting the lens into the adapter ring.
- f) Make sure that the front of the lens is in direct contact with the black adapter ring.
- g) Verify that the lens is centered in the opening on top of the enclosure. To do this you may need to move the entire body of the Camera and the ring so that the lens is also in the center of the adapter ring.

**WARNING: Failing to center the lens in the adapter ring and the hood can cause the focusing ring located on the front side of the lens to mechanically rub or bind.**

- h) Secure the Gel Doc™ XR bracket (attached to the Camera) to the bracket of the Universal Hood II using the screw and knurled knob (see pictures below)
- i) Tighten the two screws of the Gel Doc™ XR Camera bracket. Check that the lens is well positioned on the black adapter ring for a complete light seal.
- j) A completely assembled Camera will look like the picture shown below.



Screw, washer and knurled knob

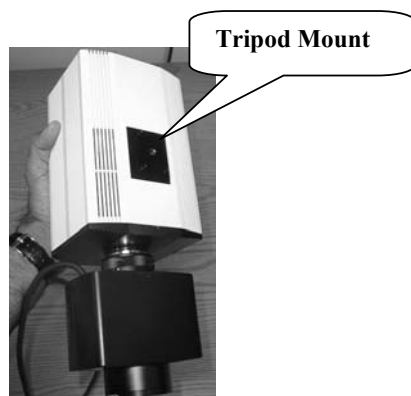


Gel Doc™ XR Camera assembled

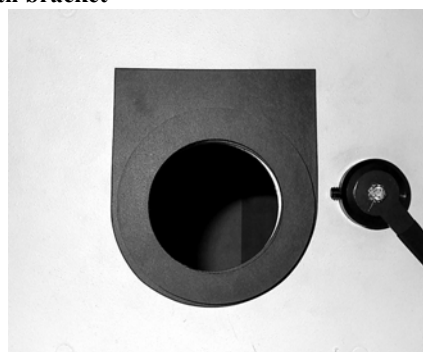
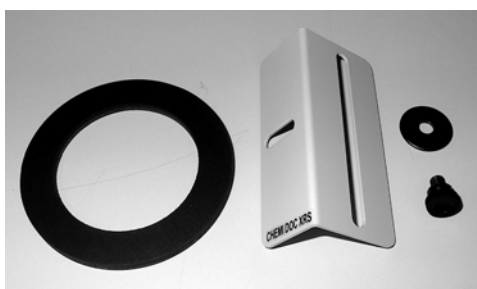
Upon completion of the Camera installation, refer to **Section 4.2.3** and **Appendix A** for a complete description of the cable connections.

### **ChemiDoc™ XRS**

- a) Place the Camera on the bench so that the locking hole of the tripod mount is facing you.
- b) Fix the ChemiDoc™ XRS bracket to the Camera, do not tighten the screw.
- c) Place the black adapter ring (6 millimeters thickness) on the top of the hood with its soft side facing up.

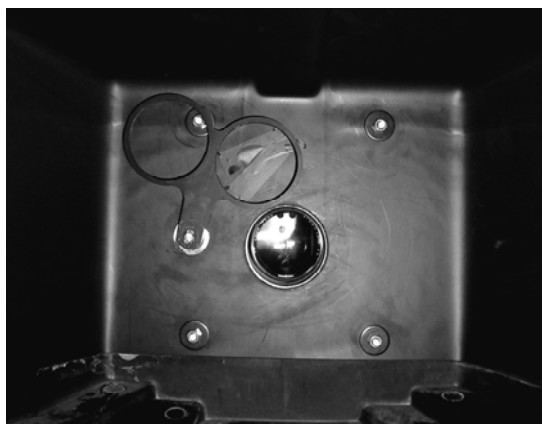


**ChemiDoc™ XRS Camera with bracket**



**Black adapter ring for ChemiDoc™ XRS Camera and its positioning on the top of the Hood**

- d) Position the ChemiDoc™ XRS Camera over the opening on the top of the enclosure by inserting the lens through the adapter ring. Make sure that the lens is in close contact with the black adapter ring. Adjust the Camera position such the lens is well centered in the opening of the hood (see below).



**Center the lens in the opening of the hood as viewed from inside of the hood**

- e) Fix the Camera bracket to the bracket on the Universal Hood II using the screw, washer and knurled knob.



- f) Lower the Camera so that the lens fit properly on the gasket of the black adapter ring then tighten the black screw on the tripod mount

Upon completion of the Camera installation, refer to **Section 4.2.3** and **Appendix B** for a complete description of the cable connections.

#### ***4.2.3 Connecting the cabling harnesses***

The cable connections are different if you are installing a Gel Doc™ XR or a ChemiDoc™ XRS Camera. Please refer to the instructions included in **Appendix A, B** respectively for Gel Doc™ XR/ ChemiDoc™ XRS cable wiring.

The controls for the Motorized Zoom Lens can be operated from the membrane touch pad of the Universal Hood II or from the PC using the buttons that appear in the window when the option Gel Doc™ XR or ChemiDoc™ XRS is selected in the File Menu of the Quantity One® program. To use this option it is necessary to connect the Universal Hood II serial port (DB25) (on the back left side) to the COM1 of the computer. The PC/Mac cable is included.

**Note:** In the case when a Mac has a USB port instead of the serial port, use the USB to serial adapter (included with Mac systems) to control the lens via software.

#### 4.2.4 *Installing the White Light Transilluminator (Optional)*

To install the White Light Transilluminator, open the door to the enclosure and pull the drawer completely toward you. Locate the power cable positioned on the left side (inside of the enclosure) behind the slide of the drawer. Remove the black rubber that covers the banana plug and insert it into the White Light Transilluminator outlet. Make sure that the main power switch on the transilluminator is in the ON position. The transilluminator will not illuminate. Power to the White Light Transilluminator is controlled from the membrane touch pad. To use the White Light Transilluminator, place it horizontally on the UV Transilluminator and press the **TransWhite** button on the membrane touch pad. When the White Light Transilluminator is not in use, store it in the two plastic holders located at the rear of the enclosure.



**Storage of the White Light Transilluminator**

#### 4.2.5 *Installing the Optional 17 mm or 25 mm Wide-Angle Lenses (ChemiDoc™ XRS only):*

This installation guide covers installation of the optional lenses for the ChemiDoc™ XRS system. The following catalog numbers are covered under this category:

- i. Lens f 0.95, 25 mm, Wide Angle
- ii. Lens f 0.95, 17 mm, Wide Angle

The lens kit includes a lens and the Light Seal adapter ring. See pictures below:



**25 mm Wide Angle Lens with  
Light Seal Adapter ring**



**17 mm Wide Angle Lens with  
Light Seal Adapter ring**



### Setting Up the Lens:

1. Turn off the power to the enclosure and Camera
2. Disconnect the Camera and lens cables
3. Remove the ChemiDoc™ XRS Camera from the bracket.
4. Remove the existing Motorized Zoom Lens from the Camera by turning the lens counterclockwise. Attach the 25 mm or 17 mm lens to the Camera as shown below:



**Remove existing Motorized Zoom Lens**

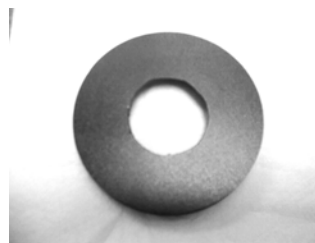


**Install the Wide Angle Lens**

5. The Wide Angle Lenses comes with a Light Seal that is donut shaped. One side is soft and has a groove around the inner opening. The other is hard. See picture below



**Light Seal soft side (Note groove)**



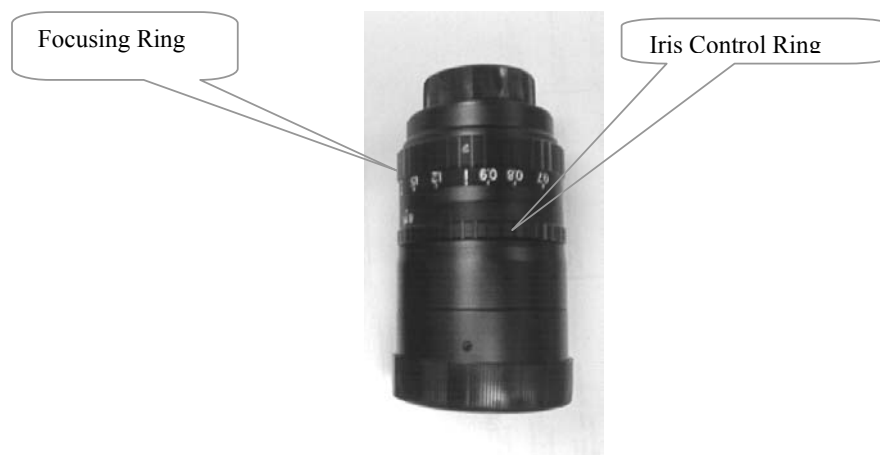
**Light Seal hard side**

6. Position the Light Seal on the top of the hood. Make sure that the “hard side” is against the top of the enclosure. Secure the Camera (with wide-angle lens attached) to the Camera bracket with the black washer and the thumbscrew. Before tightening the screw make sure that the wide-angle lens is positioned in the round slot in the Light Seal (soft side up). Carefully push the Camera down so that the lens goes into the slot all the way and comes to a stop. See pictures below:



**Make sure that the lens is seated properly in round slot in the soft side of the Light Seal**

7. Adjust the position of the bracket so that the Light Seal and lens are well centered in the round opening in the Universal Hood II and tighten the screws to secure the Camera tightly to the hood.
8. The Wide Angle lenses have an Iris and Focus ring that allows users to adjust for optimum light collection and focal plane. See image on the next page.

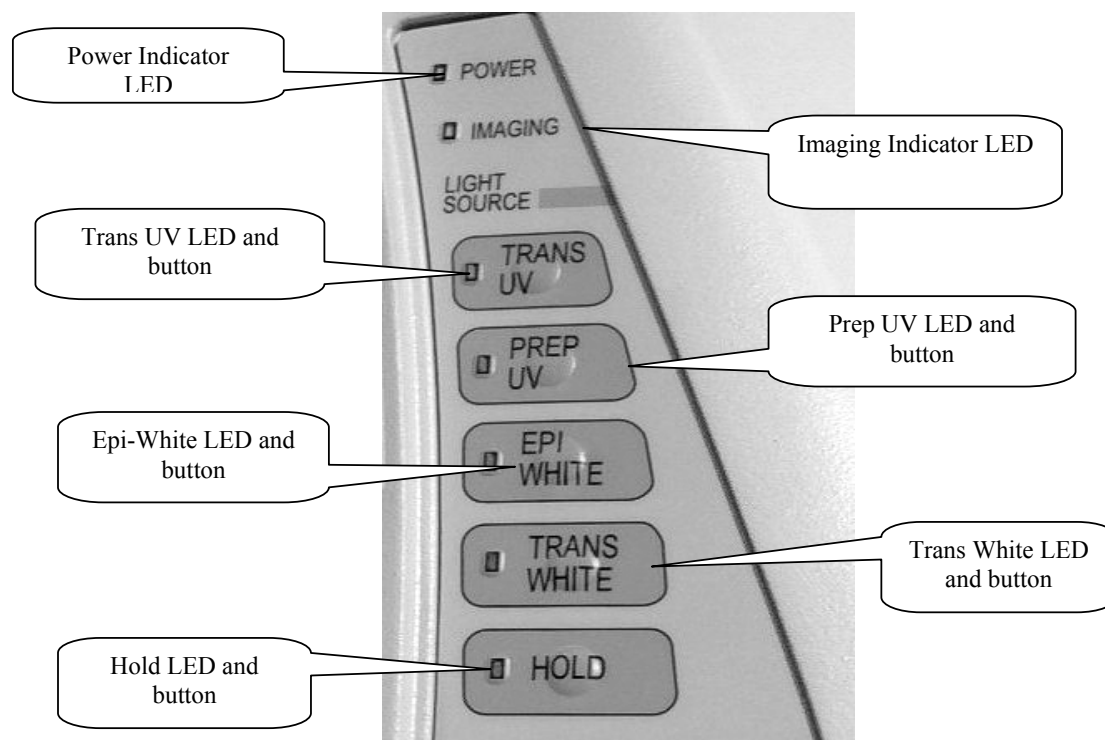


9. For imaging of chemiluminescent samples, make sure that the Iris is opened all the way.

### 4.3 Description of System Function and System Initialization

#### 4.3.1 Control panel

The front membrane touch pad control panel of the Universal Hood II allows full control of the Motorized Zoom Lens, UV transillumination, White Epi illumination and White Light transillumination. Please read the following section to become familiar with each function.



**Membrane Touch Pad**

The **Power** light tells you whether the system is turned on or not. The power on/off switch is located at the rear bottom left side of the enclosure.

The **Imaging** led blinks when you are acquiring an image with the Camera (this function is not present using the Gel Doc™ XR or ChemiDoc™ XRS Cameras) indicating integration by the Camera. It also blinks if the computer is turned off.

## Light Sources

The **Epi-White** button controls the Epi White illumination. Press the button to turn ON Epi-White; press the button again to turn it OFF. Epi illumination will automatically turn off after 15 minutes, unless the **Hold** button is activated. When the UV transilluminator switch is activated **Epi-White** is automatically turned off.

The **White Light Trans** button controls the White Light Transilluminator when installed (optional). It will automatically turn off after 15 minutes, unless the **Hold** button is activated.

The **UV Trans** button controls the UV Transilluminator with full intensity. The transilluminator will automatically turn off after 15 minutes unless the **Hold** button is activated. For safety purposes, this switch is subject to the following automatic controls:

- It is automatically turned off when the front door is open.
- It is automatically turned off when the drawer is open.

If the door or drawer is opened while the transilluminator is ON, the blinking LED will warn you that the transilluminator has been turned OFF. After the door or the drawer is closed, you have to press the UV Trans switch again to turn it ON.



**Important:** For the purposes of band cut applications, it is possible to turn ON the UV light with the drawer fully open. You must wear all possible UV protections, especially for your eyes, when the transilluminator switch is turned ON with the drawer fully open. The UV shield has to be used but glass or mask and gloves are recommended to block the UV radiations. This option is not applicable to the door.

**Wichtig:** Wer die Absicht hat, Banden aus dem Gel zu schneiden, kann bei eingeschaltetem UV-Licht die untere Schublade oeffnen. Sie muessen Schutzkleidung und die notwendigen UV-Schutzmassnahmen tragen, besonders Augenschutz, wenn der transilluminator bei offener Schublade eingeschaltet ist. Das Plexiglasschutzschild muss benutzt werden, ebenso Schutzbrille oder Schutzmaske und Einmalhandschuhe, um sich vor der UV-Strahlung zu schuetzen. Diese Moeglichkeit ist von der Geraetetuer aus nicht anwendbar.

The **UV Prep** switch is used to decrease the light output of the UV Transilluminator. The UV Preparative function is a lower intensity light designed to minimize the effects of UV exposure on DNA. The Preparative mode is recommended for applications that require longer UV exposure times. In order to activate the UV Prep switch, the UV Trans button must be on.

The **Hold** key disables the automatic shut-off of the UV and White light transilluminators and the Epi-illumination; the lights will remain active until the hold status is cancelled. When the **Hold** key is pressed, the orange LED lights, indicating that the **Hold** function is active.

If opening the door or drawer (activating the UV interlock, which turns off the UV), you will need to turn off the **Hold** button before pressing any other switch. The control panel has a second section that includes the buttons to run all the MZL functions (see the Lens Control Section below).

### Camera Lens and Filters

The MZL functions are operated from the membrane touch pad or through the acquisition window in the software. To control the lens through the Quantity One® acquisition window, it is necessary to connect the Universal Hood II with a null modem cable (serial cable) from the COM1 port on your computer to the serial port of the hood itself. A serial cable is supplied with each instrument. If the only port present is the USB port then it is necessary to use a USB To Serial converter (Part # 170-8009) for PC and for Mac (all Mac systems ship with a converter).

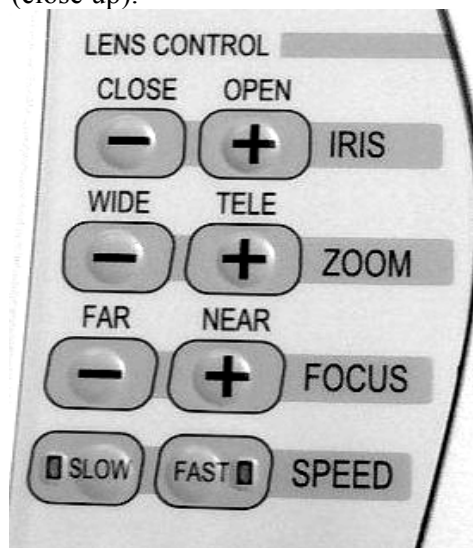
### Lens Control

The membrane pad has a **Fast** and a **Slow** button to obtain rapid or fine adjustments of the lens. An image can be optimized with the following lens adjustments:

**Aperture** is adjusted using the “**Iris**” buttons on the membrane touch pad. The size of the aperture opening allows the CCD sensor to take in more or less light. The **Iris** has two buttons: One button, **Close (-)**, reduces the size of the aperture decreasing the amount of light coming into the sensor, thereby making the image darker. The other button, **Open (+)**, opens the aperture increasing the amount of light coming into the sensor, resulting in a brighter image.

**Focus** is adjusted using the “**Focus**” buttons on the keypad. Pushing the **Near (+)** button or the **Far (-)** button changes the focal point of the lens and allows the user to focus on the sample.

**Zoom** is adjusted using the “**Zoom**” buttons on the keypad. It allows you to change the size of the image on the screen. Pushing the **Wide (-)** button zooms out (far field). Pushing the **Tele (+)** button zooms in (close up).



Membrane touch pad – Lens Control Section

**Filters:** A **+1 Diopter** is factory installed on the lens. This Diopter should always remain on the lens assembly. An **Amber Filter** is included in the Accessory Kit. Place the Amber filter in position 1 or 2 of the Filter Slider (See 4.2.1). The Amber filter should be used for fluorescence (UV) and colorimetric (White light) applications.

### 4.3.2 System Initialization

Before starting the initial test please make sure that:

1. The software and the digitizing board are installed properly (See **Appendix C and D**).
2. The cabling harness is connected properly. (See **Appendix A or B**)

Please follow the procedure in the table to ensure that the Universal Hood II is functioning properly.

#### STEP 1: Initial test for the Universal Hood II:

	Procedure	Control Panel
	<b><i>Make sure the door and drawer are closed and the computer is switched on.</i></b>	
	Turn on the system.	Power LED turns on after short blinking.
	Wait for 30 minutes for Camera to warm up	Nothing will change except the Camera will warm up.
	Press the Epi-White key.	Epi-White LED turns on.
	Open the door.	Epi-lights are on, Trans UV LED blinks.
	Press the Epi-White key again. Close the door.	Epi-lights and LED are turned off. Trans UV LED turns off.
	Press the Trans UV key.	Trans UV LED turns on.
	Open the door.	Trans UV LED blinks.
	Close the door.	Trans UV LED turns off.
	Press the Trans UV key.	Trans UV LED turns on.
	Open the drawer.	Trans UV LED blinks.
	Close the drawer.	Trans UV LED turns off.
	Press the Trans UV key.	Trans UV LED turns on.
	Press the Prep UV key	Prep UV LED turns on.
	Press the Hold key.	Hold LED turns on.
	Open the drawer.	Trans UV LED blinks, Prep UV LED and Hold LED turns off.
	Close the drawer.	Trans UV LED turns off.

**Note:** The Light Source buttons on the control panel are disabled when the Imaging LED blinks (indicating that the computer is switched Off).

**STEP 2: Initialization of the Camera and lens assembly Procedure (for Gel Doc™ XR/ ChemiDoc™ XRS systems):**

1. Press the Epi-Illumination button.
2. Open the door and determine if lights are on.
3. Place the focusing target on the UV transilluminator.
4. Double click on Quantity One® software icon on the desktop. From “File Menu” select “Gel Doc™ XR” or “ChemiDoc™ XRS”.

**NOTE: Dark Reference comes up on first use for both Gel Doc™ XR and ChemiDoc™ XRS systems. Please refer to next step for details about “Reference Dark” image acquisition.**

5. Select Live/Focus.
6. An image of the target will appear on the computer screen. Using the lens control buttons on the membrane touch pad or the control panel that appears in the software, find the best Iris, Focus, and Zoom conditions.

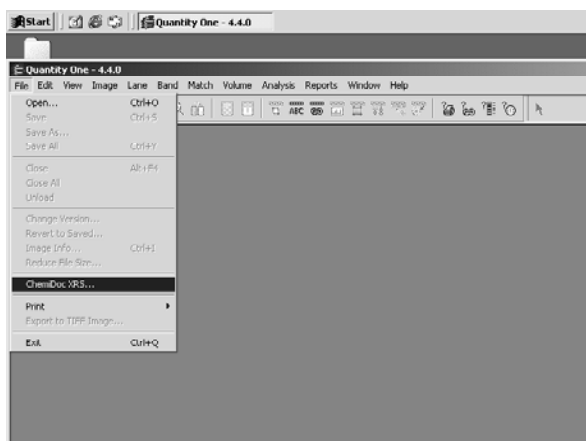
**Note: Working with a widely open Iris and changing the Zoom may require you to adjust the Focus.**

**STEP 3: Dark Reference Acquisition:**

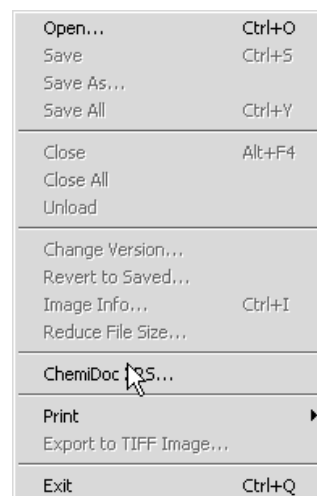
**Note: Please note that the steps described below must be performed in either of the following scenarios:**

- a. When installing the system with a new computer or Camera
- b. When software is first installed or reinstalled for any reason

1. Make sure that all lights in the Universal Hood II are off.
2. Make sure that the Lens Cap is on the lens. **This is critical!**
3. Power ON the Camera and the Universal Hood II.
4. Wait for 30 minutes for the system to warm up and stabilize
5. Double click on Quantity One® software icon on the desktop. From “File Menu” select Gel Doc™ XR OR ChemiDoc™ XRS.

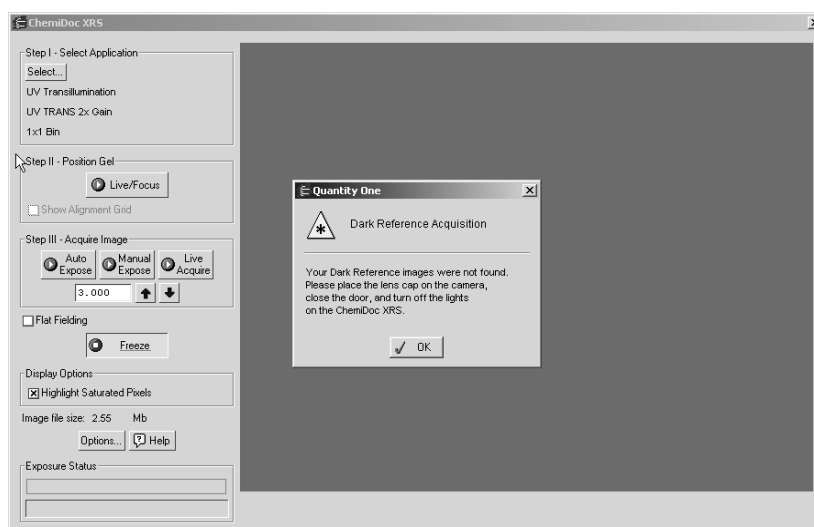


TDS Quantity One® Window



Select Gel Doc™ XR OR ChemiDoc™ XRS from File Menu

5. The following window will open with a notification that the system will be acquiring Dark Reference images.



**Note: No lights should be turned ON. Please allow approximately 30 seconds for the Gel Doc™ XR and 30 minutes for the acquisition of the Dark Reference files ChemiDoc™ XRS systems.**

1. After the “Dark Reference” acquisition is over the system will be ready to operate.
2. Turn ON the Epi-White lights using the Epi-White touch pad button.
3. Place the focusing target on the transilluminator platen.
4. Click on Live/Focus.
5. An image of the target will be seen on the imaging screen.
6. Using the lens control buttons on the membrane touch pad or the control panel that appears in the Quantity One® acquisition window, adjust the Iris, Focus, and Zoom.
7. Follow the procedure below to align the Camera with respect to the center of the platen.

**Note: For additional details on Dark Reference Acquisition refer to the Quantity One® Software Manual.**

#### ***4.3.3 Aligning the Camera assembly:***

Centering the CCD Camera on the opening in the top of the Universal Hood II should provide good alignment of the Camera with the center of the UV transilluminator. To verify, please follow the instructions below:

1. Place the focusing target in the center of the transilluminator.
2. Switch on the Epi-White light.
3. Open the acquisition window in Quantity One®. Select Live/Focus mode so that a live image of the target is seen on the monitor.
4. Focus on the target.
5. Click on “Show Alignment Grid” button located near Live/Focus button. A red cross hair will appear in the middle of the imaging area.
6. Loosen the bracket screw and move it slightly until the black square of the target matches with the red X-mark in the image. Tighten the screw to secure the Camera in place.
7. Select “Fast” on the hood. Press “Focus” button to confirm that the lens is responding. If not, adjust the position of the lens so that the opening on the hood offers no resistance/binding to the focus ring on the lens. This may not allow exact center of the Target to the image.
8. Use the zoom button on the control panel to zoom in and out on the image.
9. When the Camera assembly and target are correctly aligned, the center of the target will move a few millimeters in the center of the image throughout the zoom range.



## Section 5 Operation of the Universal Hood II

### 5.1 Operating the unit

The Gel Doc™ XR and ChemiDoc™ XRS Systems are easy-to-use instruments. In the Quantity One® acquisition window on your computer, select Live/Focus mode and adjust your image position, size, focus, and intensity using the lens controls. After the image is optimized, capture the image. A typical procedure is described below.

#### 5.1.1 Switch on the Universal Hood II

1. Turn on the Universal Hood II main switch (on the rear bottom left side of the enclosure).
2. Turn on the computer and start the software.
3. Select the acquisition mode from the File menu.

**NOTE:** Turn the power on for Cameras if not already done so.

#### 5.1.2 Position your gel

1. Open the door of the Universal Hood II.
2. Press the Epi-Illumination button to turn on the Epi White lights.
3. Center your gel on the transilluminator platen and close the door.
4. Adjust the lens Iris, Zoom, and Focus while looking at the computer screen.
5. Open the door and re-position the gel if necessary.
6. If using the White Light Conversion screen or the White Light Transilluminator, focusing is easily achieved if the Iris is slightly closed.

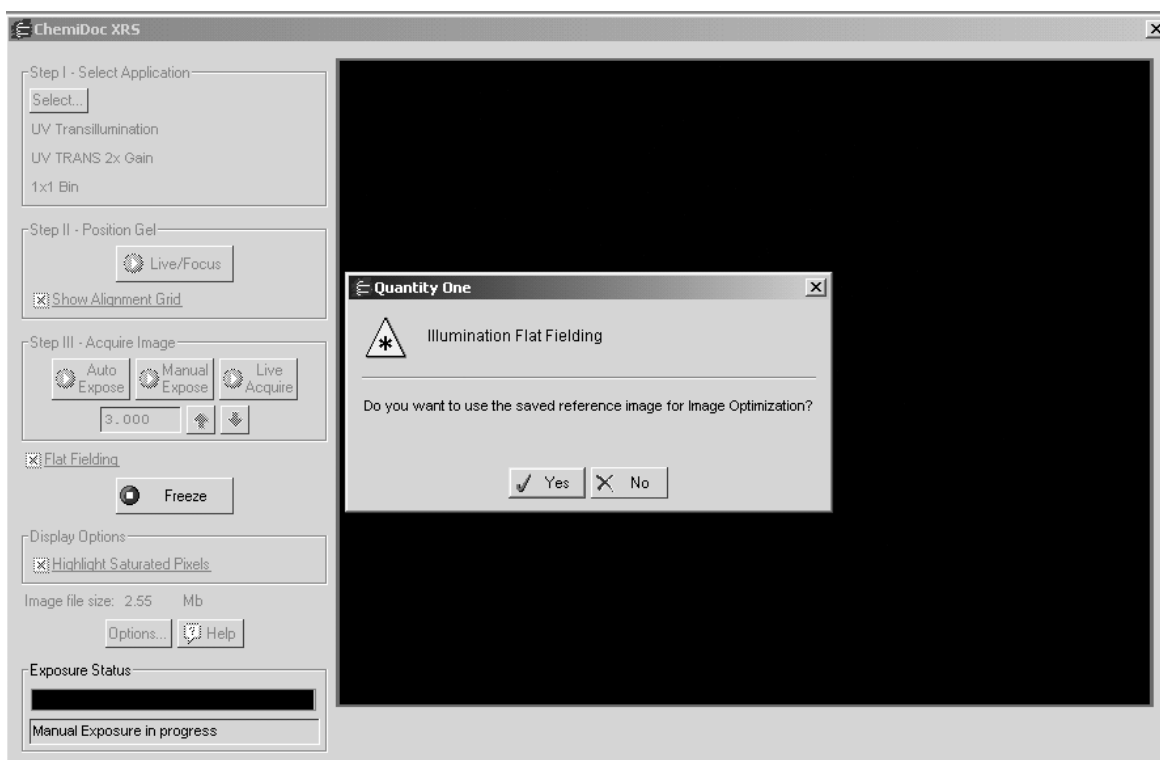
#### 5.1.3 Acquire an image

1. Press the appropriate light source for your sample
2. Select an integration time (see software manual for details).
3. When a satisfactory image is seen click **Freeze**.

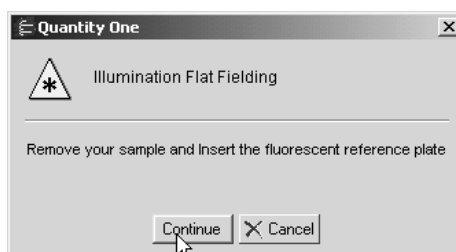
#### 5.1.4 Acquiring an image with Flat Fielding:

**Note:** This applies to ChemiDoc™ XRS systems only where Flat Fielding is made available for acquiring images with UV or White Light Transillumination.

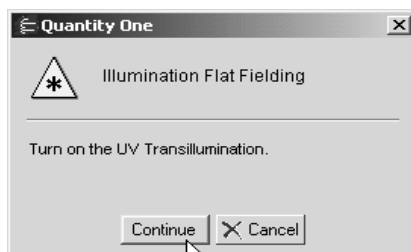
1. Center your sample on the platen.
2. Turn ON the UV or White Light Transilluminator.
3. Adjust zoom, focus and iris to get the best possible image in Live/Focus mode.
4. Make sure that the box labeled “Flat Fielding” is checked to enable Flat Fielding.
5. Select Auto Expose or Manual Expose.
6. Following the exposure, a window will open asking if you would like to use a saved reference image for Flat Fielding.
7. Select NO unless you have recently acquired a Flat Field reference image and are still using the same illumination and lens settings.
8. Select YES if you are using the same lens and illumination settings that were used to previously generate a Flat Field reference image file. See image on the following page.



9. Next you will be prompted to remove your sample from the transilluminator and place the Fluorescent Reference Plate on the platen for UV illuminated images. For White Light Illumination the White Light Transilluminator or the UV conversion screen is used to collect the reference Flat Fielding image. In either case you must remove the sample from the platen.



10. Remove the sample from the transilluminator. Remove any liquid or residue remaining from the sample platen. Place the Fluorescent Reference Plate on the platen. Make sure that the plate covers the entire glass surface. Close the door and then click on “Continue” in the window shown above.
11. The next prompt will direct you to turn ON the UV transilluminator. Press the UV transilluminator or White transilluminator button on the hood, as the case may be, and click on “Continue”.



**Note: When using the White Light, you must turn ON the UV Transilluminator after removing the sample.**

12. The system will automatically acquire a reference image and a flat-fielded corrected image of the sample will be generated for you to save and analyze.
13. For additional details on Flat Fielding please refer to the Quantity One® Software Manual. You may also click on the Quantity One® HELP button for a detailed description.

## **5.2 Cutting gels**

1. Open the drawer until it is fully extended and the UV Trans LED stops blinking.
2. Place the clear acrylic UV protection screen in the horizontal slot in the inside of the drawer facing the transilluminator.



**!! CAUTION!! !! VORSICHT !!**

**WARNING: EXPOSURE TO UV RADIATION IS HAZARDOUS TO HEALTH. PLEASE WEAR PROPER UV PROTECTIVE CLOTHING AND FACE AND EYE SHIELDS WHEN CUTTING GELS. THE UV SHIELD PROVIDED WITH THE SYSTEM IS NOT ADEQUATE PROTECTION AGAINST UV GENERATED BY THIS SYSTEM.**

3. Press the UV Trans button to turn on the UV illumination.
4. Cut the gel.
5. Press the UV Trans button and the UV transilluminator will turn off. Remove the acrylic UV protection shield before closing the drawer.

## Section 6 Trouble Shooting

Problem	Possible Cause	Solution
Image is not visible on the monitor	<ul style="list-style-type: none"> <li>Aperture is closed.</li> <li>Incorrect monitor settings</li> <li>Wrong cable connections.</li> </ul>	<ul style="list-style-type: none"> <li>Open the aperture.</li> <li>See your computer manual</li> <li>See Appendix A or B for correct cabling.</li> </ul>
Image is not bright enough.	<ul style="list-style-type: none"> <li>Wrong aperture setting</li> <li>Insufficient exposure time</li> </ul>	<ul style="list-style-type: none"> <li>Open the aperture</li> <li>Select longer exposure time</li> </ul>
Impossible to image whole sample area.	<ul style="list-style-type: none"> <li>Lens is zoomed-in too close.</li> </ul>	<ul style="list-style-type: none"> <li>Zoom-out the lens.</li> </ul>
Printout does not look the same as the image on the monitor.	<ul style="list-style-type: none"> <li>Monitor settings are wrong.</li> <li>Thermal printer settings are wrong</li> </ul>	<ul style="list-style-type: none"> <li>Read the manual for the printer to ensure proper settings</li> </ul>
Light leakage into the darkroom.	<ul style="list-style-type: none"> <li>The lens body is not properly centered and against the light seal gasket on the hood</li> <li>The rear hole on the MZL not closed with the screw.</li> </ul>	<ul style="list-style-type: none"> <li>Loosen the bracket and move the Camera around to properly seal the opening on the hood or adapter plate as the case may be.</li> <li>Close the hole with the black plastic screw.</li> </ul>
Hot (very bright) pixels are seen in the image (ChemiDoc™ XRS only)	<ul style="list-style-type: none"> <li>“Reference” is not selected for “Dark Subtraction” in the OPTIONS window</li> </ul>	<ul style="list-style-type: none"> <li>Select “Reference” by clicking on the appropriate box in the OPTIONS window.</li> </ul>
Hot (very bright) pixels are seen in the image (Gel Doc™ XR only)	<ul style="list-style-type: none"> <li>Corrupted “Reference Dark” image</li> </ul>	<ul style="list-style-type: none"> <li>Click on “OPTIONS” button and then click on “RESET REFERENCE DARK”</li> </ul>
ChemiDoc™ XRS Camera will not respond	<ul style="list-style-type: none"> <li>Power may be off</li> <li>Controller cable may not be seated properly</li> <li>Software Driver for the Camera is missing</li> <li>Camera may be defective</li> </ul>	<ul style="list-style-type: none"> <li>Turn ON the power to the Camera</li> <li>Make sure that Camera controller cable is connected properly</li> <li>Install Quantity One® again if the driver is not present</li> <li>Replace Camera</li> </ul>
ChemiDoc™ XRS image will not Auto expose	<ul style="list-style-type: none"> <li>The sample is too bright and saturates the image at the minimum possible exposure</li> </ul>	<ul style="list-style-type: none"> <li>Close the IRIS using the IRIS control until Auto expose is possible.</li> </ul>
Unable to focus on the sample using White Light transilluminator or conversion screen	<ul style="list-style-type: none"> <li>Aperture is open too wide causing a shallow depth of field</li> </ul>	<ul style="list-style-type: none"> <li>Close the Iris slightly and then focus again. Keep repeating until good focus is achieved</li> </ul>

## Section 7 Accessories and Replacement Parts

### Accessories and Replacement Parts

Part number	Description
170-8001	UV/White Light conversion Screen,
170-7950	White Light transilluminator upgrade for Universal Hood II
170-8066	Printer, Digital, Sony UPD905, 100-240 Volts
170-8067	Paper, High Gloss, Sony UPD895, 5 Rolls
170-8074	Filter, 520DR30
170-8075	Filter, 560DF50
170-8076	Filter, 630BP30
170-8077	Filter, 440BP70
170-8081	Kit, Filter, Amber, 62 mm
170-8072	Lens, f/0.95, 25mm, wide angle lens (ChemiDoc™ XRS only)
170-8073	Lens, f/0.95, 17mm, wide angle lens (ChemiDoc™ XRS only)
170-8068	Shield, UV, Universal Hood II
170-3759	Bio-Rad fluorescent Ruler
170-3760	Gel Cutter Ruler
170-7813	Sample Holders for gels
170-8008	Fluorescent Reference Plate (ChemiDoc™ XRS only)
170-8009	Converter, USB to Serial (Includes USB Cable)
931-0071	Cable, USB, Type A to B, 10' long
100-1381	Lamp, Epi-illumination, 11 Watt
100-2827	Lamp, Epi-illumination, 5 Watt
100-1361	Lamp, UV B (302 nm – 1 each)
170-8097	Kit, 6 lamp, 302 nm,
170-8098	Kit, 6 lamp, 254 nm,
170-6887	Kit, 6 lamp, 365 nm,
170-8080	Kit, Accessory, ChemiDoc™ XRS
100-2651	Card, PCI Digitizing, ChemiDoc™ XRS
170-8173	Card, Fire Wire, PCI, Gel Doc™ XR
100-2649	Cable, Controller, ChemiDoc™ XRS
100-2799	Cable, Extension, MZL Univ Hd II
170-7963	Cable, Serial, Mac
170-7964	Cable, Serial, PC
100-0578	Cable, Fire Wire, 10'
100-0579	Power Supply Camera Gel Doc™ XR
170-8088	ChemiDoc™ XRS Camera w/MZL
100-2648	Power Supply, Camera, ChemiDoc™ XRS
170-8096	Lens, Motorized, 8-85 mm, f 1.2 (Gel Doc™ XR)
931-0198	Lens, Motorized, 12-75mm, f 1.2 (ChemiDoc™ XRS)
100-2781	Black Adapter Ring for Gel Doc™XR (3 millimeters thickness)
100-2782	Black Adapter Ring for ChemiDoc™ XRS (6 millimeters thickness)
921-0929	Light Seal, Optional Lenses, ChemiDoc™ XRS
100-2783	Screw, knurled knob and washer

100-2784	UV transilluminator Lid (Includes filter glass)
100-2785	Universal Hood II Right Shield Epi-illumination (Lid complete)
100-1948	Universal Hood II Opal Filter Epi-illumination (w/o metal frame)
100-2786	Universal Hood II Left Shield Epi-illumination (Lid complete)
100-2787	Universal Hood II Screw Feet (4)
100-1951	Fuse T 2 A – 250 V (10 each)
100-1952	Fuse T 4 A – 250 V (10 each)
100-1370	UV TR Starter (3 each)
170-9600	Quantity One® Software PC/Mac

## Section 8 Maintenance and Part Replacement

This section covers the replacement of parts in the Universal Hood II.

### 8.1 Epi-illumination lamp replacement

The lamps are located behind the two panels on each side (left and right) of the internal side of the hood.

- Turn system power off.
- Remove the power cord.
- Open the enclosure door.
- Locate the Epi lamp housing.
- Locate the socket head screw that hold each lamp housing to the internal side of the hood.
- Remove this screw.
- The cover screen with a plastic piece will come loose. Pull on the cover to remove it from the box and the lamp will become visible.
- To remove the lamp, hold it from the receptacle and then pull it from the plastic Holder.
- Insert the new lamp (5 or 11 W) into the lamp holder and then push it into the receptacle.
- Reassemble the cover.

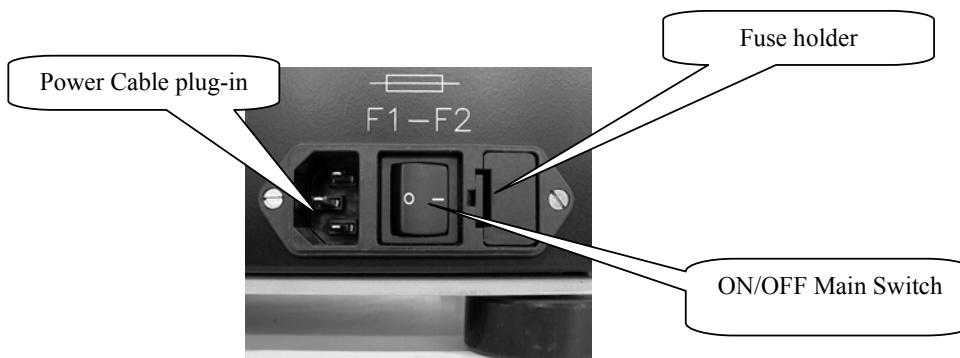


Epi-White Light 5 W assembly (left side)

### 8.2 Fuse replacement



Always unplug the instrument before changing or checking the fuses.



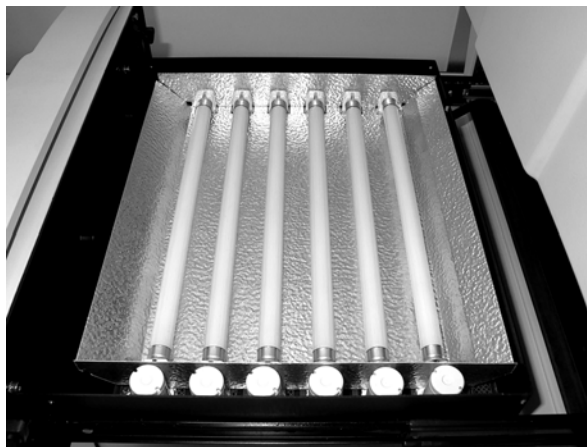
Power Entry Module



This unit is protected by 2 fuses 5X20 mm 2A Slow Blow. The fuses are located in the rear left side in a fuse holder. See above picture.

1. Unplug the main power cable from the power entry module outlet.
2. Using a screwdriver lever on the fuse holder to extract it.
3. Remove the blown fuses and replace them with two new ones (P/N 100-1951).
4. Slide the fuse holder into the power entry module until it snaps in place

### ***8.3 UV Transilluminator***



**UV transilluminator without cover**

#### ***8.3.1 Lamp replacement***

**Attention:** The UV filter surface should always be kept clean from the chemical agents used as gel dyes. Please use protective gloves when touching the UV transilluminator cover.

The lamps must be replaced after every 500 hours of use.

- Turn off the power.
- Disconnect the power cord from the Universal Hood II.
- Remove the four screws located on the left/right sides of the drawer.
- Remove the cover with the UV filter by sliding it forward.
- Place it down on its backside on a non-abrasive surface.

**Caution:** Do not put the UV filter directly on the bench.

- Wear gloves when touching the lamps. Remove the lamp by rotating it until it becomes loose and the pins come to a vertical position;
- Remove the lamp. Install the new lamp by rotating so that the pins are horizontal and the lamp is tight.
- Reassemble the cover and retighten the screws on both sides.



Lamp replacement



Starter replacement

### ***8.3.2 Starter replacement (P/N 100-1370)***

- Turn off the power.
- Disconnect the power cord from the Universal Hood II.
- Remove the four screws located on the left/right sides of the drawer.
- Remove the cover with the UV filter by sliding it forward.
- Place it down on its backside on a non-abrasive surface.

**Caution: Do not put the UV filter directly on the bench.**

- To remove the starter, rotate it counter-clockwise and pull out.
- To replace the starter insert it into the holder and rotate clockwise.
- Reassemble the cover and retighten the screws on both sides.

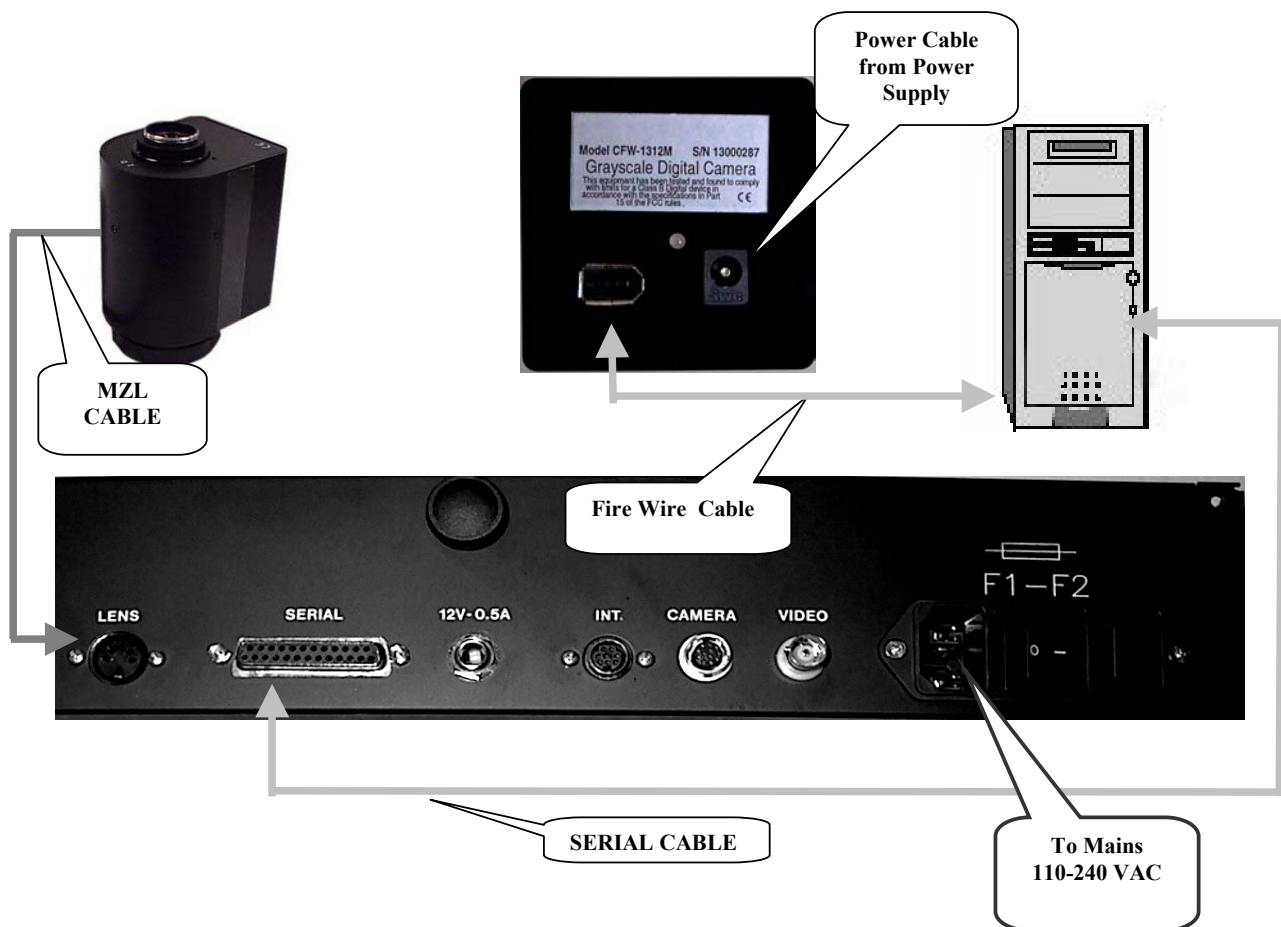
## Appendix A: Gel Doc™ XR System Cable Configuration

### Connecting the cabling harnesses

- Locate the Fire Wire cable. Connect one end of the Fire Wire cable connector to the Fire Wire connector on the Camera and connect the other end to the Fire Wire connector on the PC/Mac
- The Camera power supply cable should be plugged into the CCD Camera PWR connector.
- Connect the serial cable to the connector labeled **"SERIAL"** on the hood and the other end of this cable to the appropriate port on the PC or Mac USB to Serial Adapter.
- Connect the MZL cable connector to the connector labeled **"LENS"** on the rear panel of the universal hood.

The following table describes the connectors and their designations.

Label / Color	Instrument / Connection
6-pin Fire Wire connector	Fire Wire Connector of the PC or PCI Card
6-pin Fire Wire connector	CCD Camera Fire Wire Connector
Camera Power Supply Cord/Power Supply	Camera / PWR Connector
25 Pin D-SUB Serial Cable connector	COM1 PORT/Back of Computer
5 pin DIN Cable from Motorized Zoom Lens	Hood / LENS connector



## Appendix B: ChemiDoc™ XRS System Cable Configuration

- a. Connect the motorized zoom lens cable (which is permanently attached to the lens) to the MZL Extension Cable and then to 5-pin din connector labeled **LENS** on the **connector panel** of the hood.
- b. Connect the **Camera power cable** to the connector on the Camera labeled **POWER** (See picture below)



Camera Power Supply



Camera Power Cable



Power connector on the Camera

- c. Connect one end of the **Camera Controller cable** to the connector on the Camera labeled **DATA** and the other end of this cable should be connected to the **PCI Digitizing Card** after the card is installed in the **PC** per procedure in Step 4.2.3.

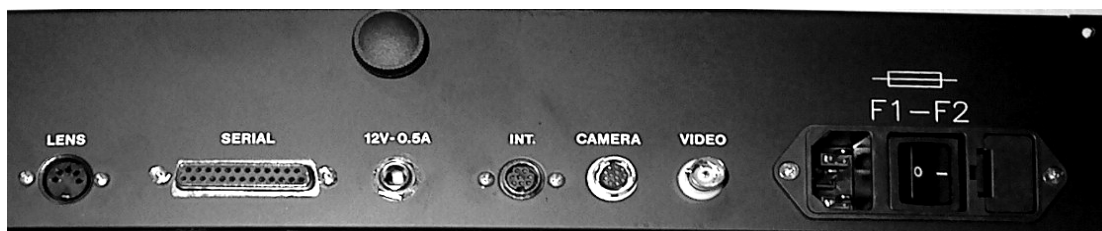


Camera Controller Cable and Connector



Controller Cable Connector labeled Data

- d. Connect the provided **Serial Cable** to the **9-pin D-SUB/8 pin round** serial connector on the **PC/Mac** and the other end of the **25 pin serial connector** on the Hood.
- e. In case of a **Mac** with a **USB**, connect the optional (170-7959) **USB to Serial adapter** (not included) with a **USB cable** to the **Mac** and then connect the **8 pin round connector** of the **Mac serial cable** (170-7963) between the adapter and the Hood.
- f. Now proceed with installation of the PCI Digitizing Card and software.



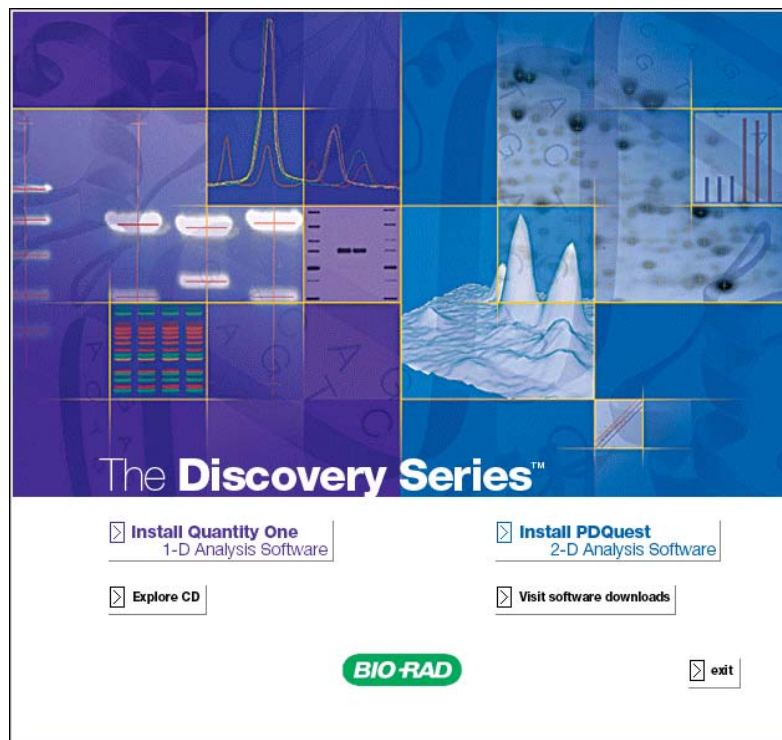
CONNECTOR PANEL FOR ON THE HOOD

## Appendix C: Installing Software and Drivers

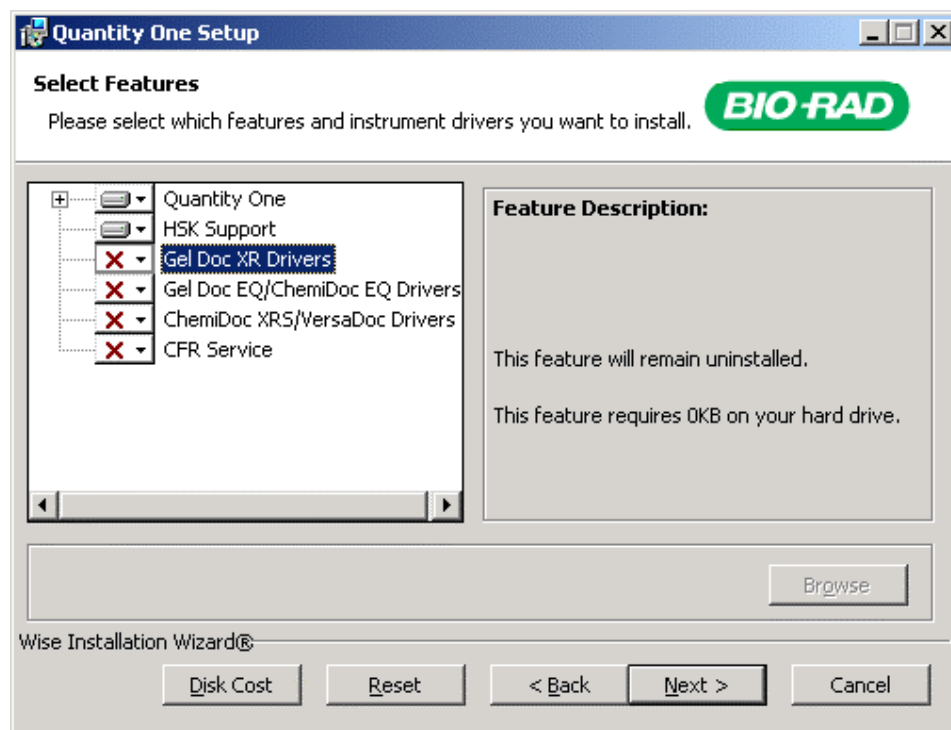
### *Gel Doc™XR and ChemiDoc™XRS- PC:*

**CAUTION:** You must install the drivers **BEFORE** installing the PCI card.

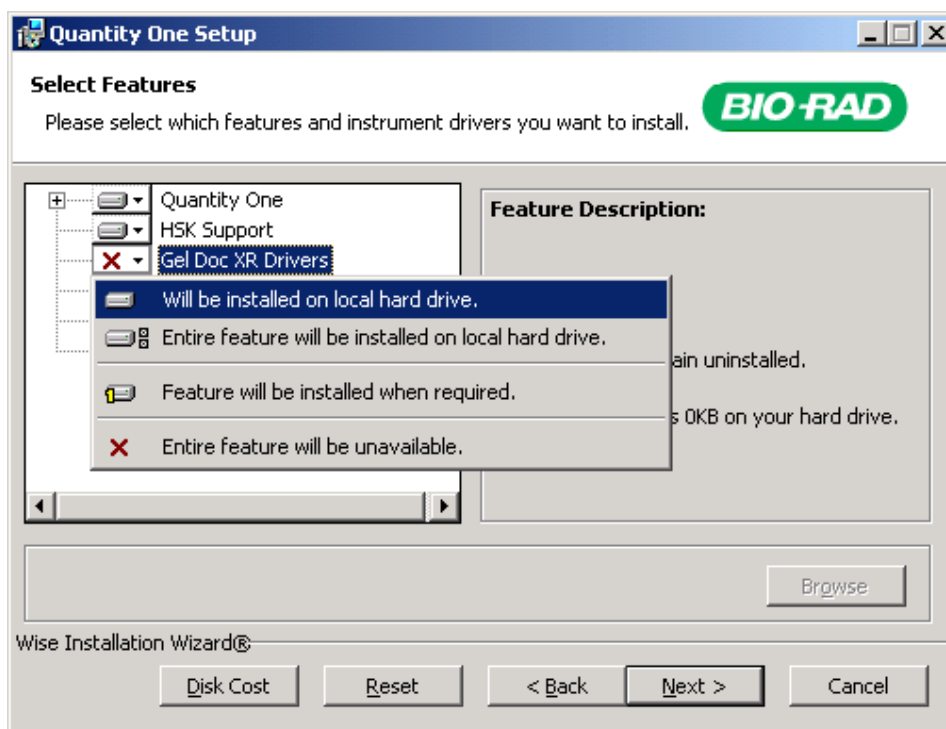
- a. Insert the Discovery Series CD into the CD ROM drive of the PC. It will go into AUTO RUN mode and the following window will open:



- a. Depending on which application you are using (Quantity One® or PDQuest), click “Install” to run the installer.
- b. If this is a new installation, follow the installation steps until you get to the “Select Features” dialog box. If you have already installed the application, click Modify to open the “Select Features” dialog box.



- c. Click the Driver feature (ChemiDoc™ XRS/VersaDoc or Gel Doc™ XR) and select “Will be installed on local hard drive.” from the list:

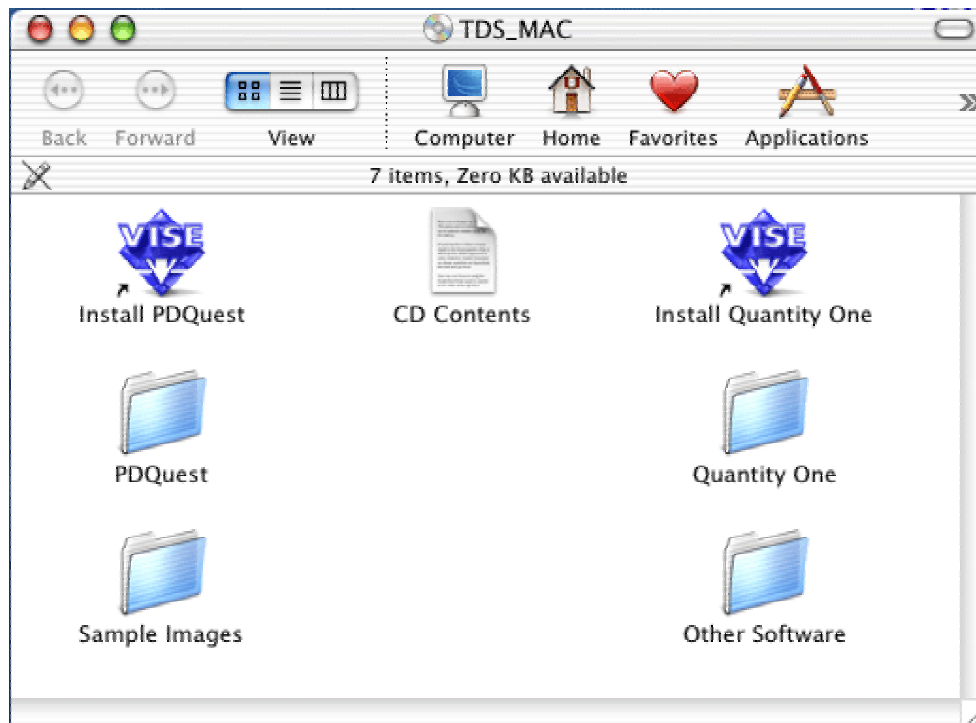


- d. Click “Next” to complete the installation.

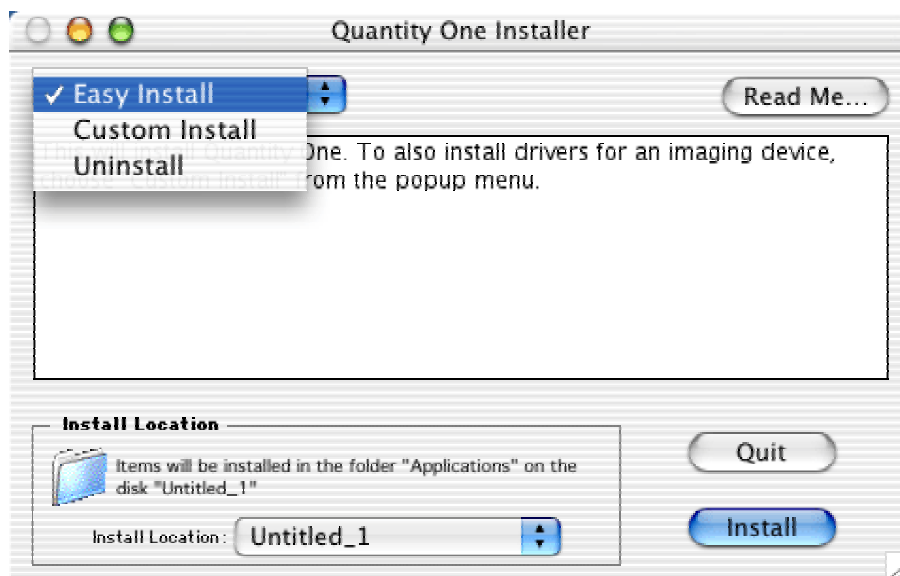
**Note:** If the Windows Device Manager detects a conflict, it may be necessary to move the PCI card to a different slot to avoid conflict with an existing card in the PC.

***Gel Doc™XR and ChemiDoc™XRS- Mac:***

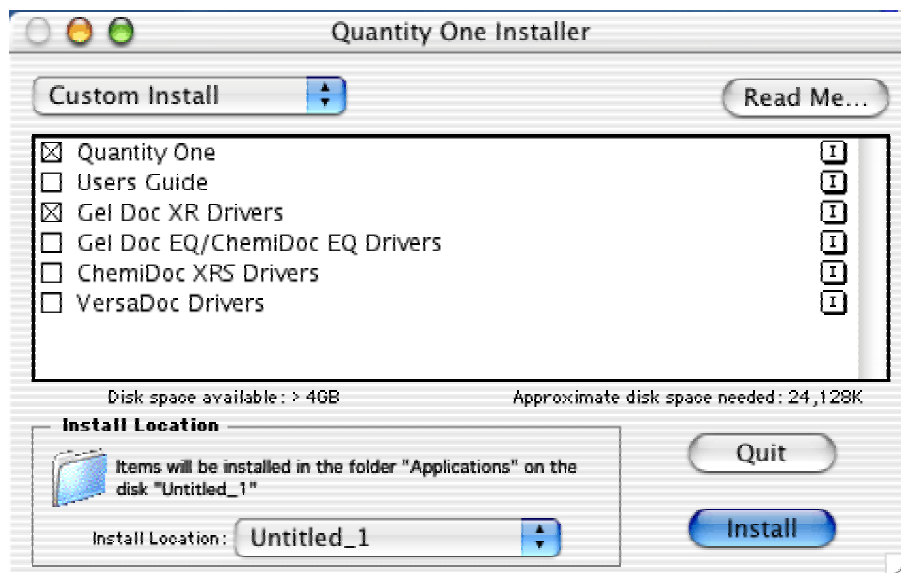
- a. Insert “**The Discovery Series**” software CD into the CD ROM drive of the PC. The CD will show up on the Apple Desktop as an Icon
- b. Double click on the CD icon the following window will open



- c. Click on the installer for your application and the follow the prompts to to the following Installation Wizard:



- d. From the pull down menu, select “Custom Install”.



- c. Select the Driver you want to install. If you have not yet installed the application, be sure to select that as well.
- d. When you have made your selections, click Install to complete the installation.

Also read the Release Notes file for last minute updates for the Software.



## Appendix D: PCI Card Installation

Please follow the instructions below to install the Fire Wire Card into your PC/Mac as the case might be.

### ***Gel Doc™XR – PC:***

- a. Install the PCI Fire Wire card in the PC first
- b. Start the computer.
- c. In case of a PC Windows XP or 2000 the operating system will recognize the card and automatically install the appropriate driver for it.

### ***Gel Doc™XR - Mac:***

Current Mac systems generally have onboard Fire Wire ports (connectors). The Gel Doc™XR Camera can be plugged directly into any one of these connectors and Bio-Rad Software interface will be able to communicate with the Camera via this port.

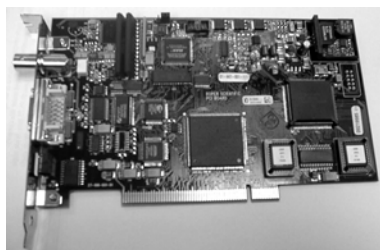
### ***ChemiDoc™XRS- PC:***

### ***Installing the PCI Digitizing Card***

**NOTE:** When installing the PCI Digitizing Card for the ChemiDoc™ XRS, please install the DRIVERS for the Card and the “Quantity One Software” from the software CD first.

**Please refer to “Appendix C” for step-by-step instructions for driver installation.**

- a) Make sure that your computer is turned off. Remove the cover from the computer.  
Install the PCI card into one of the PCI slots in the computer (PC/Mac)
- b) Close the cover.



**PCI Digitizing card for ChemiDoc™ XRS**



**Connect the ChemiDoc™ XRS Camera  
Controller Cable to the PCI card.**

- c) In the case of the ChemiDoc™XRS, connect the Camera Controller Cable to the PCI card as shown in the picture above. Note that the other end of this cable is connected to the Camera
- d) After all connections are made the system is ready for Initialization as described in section 4, sub section.4.3.2.

## Appendix E: Technical Specifications

Model	Gel Doc™ XR	ChemiDoc™ XRS
<b>Application</b>		
Chemiluminescence	No	Yes
Fluorescence	Yes	Yes
Chemifluorescence	No	No
Colorimetric/Densitometry	Yes	Yes
Gel Documentation	Yes	Yes
Isotopic Imaging	No	No
<b>Hardware Specifications</b>		
Maximum Sample Size	28 x 36 cm	28 x 36 cm
Maximum Image Area	25 x 26 cm	25 x 26 cm
Excitation Source	Trans UV 302, 254, 365 nm & White, Epi-White light	Trans UV 302, 254, 365 nm & White, Epi-White light
Illumination modes	3 Trans UV & White, Epi-White	3 Trans UV & White, Epi-White
Detector	CCD	Super Cooled CCD
CCD Resolution (H x V)	1360(H) x 1024 (V)	1300 (H) x 1030 (V)
Pixel Size (in Microns)	4.65(H) X 4.65 (V)	6.7 (H) X 6.7 (V)
Cooling System	No	Peltier cooled
Camera Cooling Temp.	NA	-45°C
Filter Holder	3 positions 2-Emission Filter 1-Chemi	3 positions 2-Emission Filter 1-Chemi
Emission Filters	1 Included (amber), 4 optional	1 Included (amber), 4 optional
Dynamic Range	3.0 Orders	> 3.0 Orders
Pixel Density (gray levels)	12 bit (4096 gray levels)	12 bit (4096 gray levels)
Dynamic Flat Fielding	No	Yes
Instrument Size (cm)	36(L) x 60(W) x 96(H)	36(L) x 61(W) x 96(H)
Instrument Weight (kg)	32 kg	32 kg
<b>Software Specifications</b>		
Application Driven	Yes	Yes
Windows XP	Yes	Yes
Windows 2000	Yes	Yes
Mac OS 10	Yes	Yes
Image File Size (MB)	Approx. 2.5 MB	Approx. 2.5 MB
<b>Operating Ranges</b>		
Operating Voltage	100/115/230 VAC Nominal	100/115/230 VAC Nominal
Operating Temperature	10-28°C (21°C recommended)	10-28°C (21°C recommended)
Operating Humidity	< 70% non-condensing	< 70% non-condensing